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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/776,184	02/12/2004	Takao Ohno	Q79839	3094
23373	7590	10/14/2005	EXAMINER	
SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037			VO, HAI	
			ART UNIT	PAPER NUMBER
			1771	

DATE MAILED: 10/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/776,184

Applicant(s)

OHNO ET AL.

Examiner

Hai Vo

Art Unit

1771

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 31 August 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) 8-32 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7, 33 and 34 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☒ Certified copies of the priority documents have been received in Application No. 10/030,247.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 0212.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

***Election/Restrictions***

1. Applicant's election without traverse of Group I, claims 1-7, 33 and 34 in the reply filed on 08/31/2005 is acknowledged.
2. The art rejections over Tamura et al (US 4,539,393) taken alone or in combination with several references made in the 08/12/2003 Final Office Action of Patent Application No. 10/030,247, now abandoned are withdrawn for the following reasons. Applicants' arguments and the declaration of Mr. Susumu Honda show that the film of Tamura does not have a porosity within the claimed range based on the porosity formula as cited at page 4 of the 04/15/2004 preliminary amendment. The porosity of the Tamura film is at most 7.8% as calculated from the density of Tamura. However, upon further consideration, new grounds of rejections are made in view of Shinohara et al (US 6,447,958) and Daido et al (US 6,291,106).

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-4, 33 and 34 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Daido et al (US 6,291,106). Daido teaches a porous film made from a polymetaphenylene isophthalate has a gas permeability of 100 sec/100 cc.in<sup>2</sup> or less and a thickness of 50 microns or less (column 7, lines 1-5). The porous film has a porosity of 62% and a density of 0.53 g/cm<sup>3</sup> (example 1). The porous film is suitable as a battery separator (column 4, lines 25-30). Daido does not specifically disclose the cross-sectional pore laminar coefficient, specific Young Modulus and percent of gas permeability retained after heat treatment at 350°C for 10 min. However, since the porous film of Daido is made of the same material as that of the present invention and has a thickness, porosity, density and gas permeability within the claimed ranges, it is not seen that the porous resin film of Daido would have performed differently than that of the present invention in terms of the cross-sectional pore laminar coefficient, specific Young Modulus and percent of gas permeability retained after heat treatment at 350°C for 10 mins so as to efficiently function as a battery separator. Accordingly, Daido anticipates or strongly suggests the claimed subject matter.

6. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Daido et al (US 6,291,106) in view of Shinohara et al (US 6,447,958). Daido does not specifically disclose the porous film containing inorganic whiskers.

Shinohara, however, discloses a porous film as a battery separator comprising a heat resistant polymer and a ceramic powder wherein the heat resistant polymer includes both meta-oriented aromatic polyamide and para-oriented aromatic polyamide (column 3, lines 40-55). Shinohara discloses the ceramic powder present in the amount of 5 to 100 parts by weight per 100 parts by weight of a heat-resistant polymer (column 8, lines 1-3). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to add ceramic powder in the film composition motivated by the desire to impart mechanical strength and dimensional stability of the film.

7. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Daido et al (US 6,291,106) in view of Shinohara et al (US 6,447,958) as applied to claim 5 above, further in view of Tsutsumi et al (US 5,571,875). Shinohara does not specifically disclose the L/D ratio of a ceramic powder. Tsutsumi teaches a polyimide based resin composition that is excellent in processibility and has improved mechanical characteristics, heat resistance and chemical resistance (column 3, lines 5-10). Tsutsumi teaches the polyimide based resin composition comprising a whisker having a fiber length L from 5 to 50 microns and a fiber diameter D from 0.05 to 1 microns within the claimed range (column 22, lines 30-33). Such a dimension would have been recognized by one skilled in the art to

impart the mechanical strength and dimensional stability while maintaining an ease of the film processing. As such, in the absence of unexpected results, it would have been obvious to one having ordinary skill in the art at the time the invention was made to employ the ceramic powder having the L/D ratio as taught by Tsutsumi motivated by the desire to impart mechanical strength and dimensional stability while maintaining an ease of the film processing.

8. Claims 1-6, 33, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shinohara et al (US 6,447,958) in view of Cieslak et al (US 5,002,843). Shinohara discloses a porous film as a battery separator comprising a heat resistant polymer and a ceramic powder wherein the heat resistant polymer includes both meta-oriented aromatic polyamide and para-oriented aromatic polyamide (column 3, lines 40-55). Shinohara discloses the porous film having a porosity greater than 50% and a thickness of 5 to 30 microns or less (column 5, lines 65-67 and column 10, lines 20-22). Shinohara discloses the porous film having an air permeability of 680 cc/sec (column 18, lines 8-10). Shinohara discloses the ceramic powder present in the amount of 5 to 100 parts by weight per 100 parts by weight of a heat-resistant polymer (column 8, lines 1-3). Shinohara discloses the para-oriented aromatic polyamide is preferable because it tends to become porous (column 3, lines 55-56). However, there is no suggestion that the meta-oriented aromatic polyamide is excluded from the porous film. Shinohara does not disclose that polymetaphenylene isophthalamide is the meta-oriented aromatic polyamide. Cieslak, however,

discloses a battery separator made from polyparaphenylene terephthalamide and polymetaphenylene isophthalamide (column 3, lines 35-37). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use polymetaphenylene isophthalamide as meta-oriented aromatic polyamide because such is intended use of the material and Cieslak provides necessary details to practice the invention of Shinohara.

Shinohara does not specifically disclose a cross-sectional pore laminar coefficient, specific Young's modulus and percent of gas permeability retained after heat treatment at 350°C for 10 min. However, it appears that the porous film as modified by Shinohara has the gas permeability, porosity, thickness within the claimed ranges. The resulting porous film is made from a composition similar to that of the present invention, i.e., the weight ratio of the heat resistant polymer to the whisker. Therefore, it is not seen that the resulting porous film would have performed differently than the porous film of the present invention in terms of the cross-sectional pore laminar coefficient, specific Young's modulus and percent of gas permeability retained after heat treatment at 350°C for 10 min so as to be suitable as the battery separator.

9. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shinohara et al (US 6,447,958) in view of Cieslak et al (US 5,002,843) as applied to claim 6 above, further in view of Tsutsumi et al (US 5,571,875). Shinohara does not specifically disclose the L/D ratio of a ceramic powder. Tsutsumi teaches a polyimide based resin composition that is excellent in processibility

and has improved mechanical characteristics, heat resistance and chemical resistance (column 3, lines 5-10). Tsutsumi teaches the polyimide based resin composition comprising a whisker having a fiber length L from 5 to 50 microns and a fiber diameter D from 0.05 to 1 microns within the claimed range (column 22, lines 30-33). Such a dimension would have been recognized by one skilled in the art to impart the mechanical strength and dimensional stability while maintaining an ease of the film processing. As such, in the absence of unexpected results, it would have been obvious to one having ordinary skill in the art at the time the invention was made to employ the ceramic powder having the L/D ratio as taught by Tsutsumi motivated by the desire to impart mechanical strength and dimensional stability while maintaining an ease of the film processing.

### ***Conclusion***

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai Vo whose telephone number is (571) 272-1485. The examiner can normally be reached on M,T,Th, F, 7:00-4:30 and on alternating Wednesdays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel Morris can be reached on (571) 272-1478. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

HV

*Hai Vo*

**HA/VO  
PRIMARY EXAMINER**